

Nathan J. Zeichner

Code Demo Reel Breakdown

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Programmable Matter Editor

Languages - C++

Libraries - FLTK, nVidia PhysX

Other Team Members - Steven Gray

The program was developed during a summer research project during 2009 as a part of a DARPA funded project to create origami inspired robots. The program is separated into two parts: the designer and simulator. The designer lets the user draw out rigid bodies and add rotational springs between them to allow folding. The designer also allows for the user to save and load XML documents for easy replay and iterative design. The simulator is created using PhysX and allows the designer to view their robots in motion to check for problems. This project was published in two papers, please see my resume for exact references.

<http://groups.csail.mit.edu/drl/ProgrammableMatter/>

Reference: Dr. Vijay Kumar, Dept. of Engineering and Applied Science at the University of Pennsylvania

Haptics Gore Simulation

Languages - C++

Libraries - SensAble, HLAPI

Other Team Members - Ian Perera

The simulation was created as a final project for Physically Based Animation class. The simulator takes a cloth simulator (see the cloth simulator later) and extends it to a jello-like cube. Rigid bones are added on the interior as supports for the flesh. Using HLAPI and SensAble I took in the physical information and relayed it to the haptic device. Forces from the haptic device are added to the flesh simulation and if the force exceeds a threshold the springs holding the flesh together are cut and turned red.

Mini Maya

Languages - C++

Libraries - FLTK, OpenGL

Other Team Members - Lauren Frazier, Jonathan McCaffrey

This editor was developed as a final project for Introduction to Computer Graphics. The editor is based on Maya and allows the user to edit geometric meshes based on the half-edge data structure. Working with a team I focused on mesh editing operations such as splitting edges, connecting vertices, extruding, and import and export of objs. I also developed the interface in FLTK for ease of operation. As extra credit I created the control widget in the renderer to allow the user to drag vertices like in Maya.

Cloth Simulator

Languages - C++

Libraries - Qt, OpenGL

The simulator was developed as a homework for Physically Based Animation. Implemented explicit euler, midpoint and RK4 integration methods to allow for realistic cloth. Also created collision detection and response with the skeleton that is made up capsules and cylinders.

Sweet Rolls - Bowling Game

Languages - C++

Libraries - Gamebyro Engine, PhysX

This game was an assignment in the Game Design class. I used gamebryo to create a scene and setup the physical properties of all the objects. Using PhysX I was able to tell when pins were knocked down and that formed the basis for the game mechanics. I have also implement complete bowling game rules, allowing the player to score anywhere from 0 to 300 points.